



EFFECTIVENESS OF BALLOON THERAPY ON RESPIRATORY STATUS AMONG THE PATIENTS WITH LOWER RESPIRATORY TRACT DISEASES IN SELECTED HOSPITALS, JALANDHAR, PUNJAB

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Abstract: Breathing is the flyover between mind and body, the connection between consciousness and unconsciousness. Chronic respiratory disease is found to be one of the most troubles conditions, badly affecting the calibre of human life in our society. Objective: Effectiveness of Balloon Therapy on respiratory status among the patients with lower respiratory tract diseases. Methodology: A quantitative research approach and quasi experimental research design was used and the research setting was in the selected hospital (Civil Hospital, Jalandhar, Punjab & ESI Hospital, Jalandhar, Punjab). Total 60 samples were selected with purposive sampling technique i.e. 30 from experimental and 30 from control group. Modified Dyspnoea scale, Self-structured oxygen saturation scale and self-structured respiratory rate scale was used to assess the effectiveness of balloon therapy. Results and conclusion: Results depicts that 3 scales were used to check the effectiveness of respiratory status. First modified dyspnoea scale finding shows that Pre-interventional and post-interventional level of dyspnoea was significant at $p < 0.001$ by using chi square in experimental group, pre-interventional and post-interventional level of dyspnea was non-significant in control group. Second self-structured oxygen saturation scale shows that the Pre-interventional mean \pm SD of oxygen saturation was 89.90 ± 3.39 and Post-interventional mean \pm SD was 95.80 ± 2.97 in experimental group which was significant at $p < 0.001$. Pre-interventional mean \pm SD was 90.30 ± 3.91 and post-interventional mean \pm SD was 90.60 ± 3.82 in control group which was non-significant at $p < 0.001$. Third self-structured respiratory rate scale shows that pre-interventional mean \pm SD of respiratory rate was 24.60 ± 2.6 and post-interventional mean \pm SD was 21.60 ± 2.3 in experimental group which was significant at $p < 0.001$. Pre-interventional mean \pm SD of respiratory rate was 25.40 ± 2.92 and post-interventional mean \pm SD was 25.40 ± 3.4 in control group which was non-significant at $p < 0.001$. Hence it can be said that there was effect of balloon therapy on the respiratory status among the patients with lower respiratory tract diseases in experimental group as compared to control group.

Index Terms – Balloon therapy, Lower Respiratory tract disease

I. INTRODUCTION

The respiratory system is essential and lively to every human being. The organs of respiratory system make sure that oxygen enters our bodies and carbon dioxides exit our bodies. A person can only survive for 5 to 10 seconds without taking another breath. Respiratory disease is a significant critical health problem in our society.¹

Breathing is one of the most vital functions to our body and the movement of spirit in matter.² National disease statistics (2016) worldwide shows a high prevalence of respiratory disorder. Diseases of the respiratory system are one of the main causes of death in the India and include conditions such as chronic obstructive pulmonary disease, pneumonia or asthma.³ Balloon therapy is a simple exercise that increases lung capacity is blowing up a certain amount of balloons each day.⁴ Respiratory diseases range from mild and self-limiting, such as the common cold, to life- threatening entities like bacterial pneumonia, tuberculosis, acute asthma and lung cancer.⁵

It says that COPD is 3rd leading cause of death in world. 12.7 million U.S adults (aged 18 & above) were estimated to have COPD, 10.1 million American reported chronic Bronchitis & 4.7 million with emphysema.⁶

Respiratory diseases increasing day by day in world. It affects both adults and old age. Now it is estimated that as many 300 million people of all ages and ethnic backgrounds suffer from respiratory disease. For the past 40 years, the prevalence of respiratory disease increased in all countries in parallel with that of allergy. It has been estimated to range from 4% to up to 20% in adult over 40 years of age. Recent studies show a prevalence of respiratory symptoms in 6%-7% of non-smokers and up to 14% of smokers.⁷ A study found that in 2010, there were approximately 6.8 million emergency disorders in India for patients above age of 30. In 2012, respiratory conditions were the most frequent reasons for hospital stays among old age persons.⁸

During clinical posting in Civil and ESI hospital, Jalandhar, the investigator notices that most of the patients were having breathing problem. And thus in extensive review of literature, investigator came across so many studies proved that Balloon therapy increases inspiratory volume; maintain alveolar ventilation, increases vital capacity and inspiratory reserve volume. Many articles say that balloon inflating exercise can increase pulmonary parameters. Blowing up 10 or 15 balloons steadily increases lung capacity and also amplifies the lungs' ability to maintain a sufficient supply of oxygen. As breathing problems has become most common in hospitalized patients. Hence, the investigator felt that there is a need to conduct a study on effectiveness of balloon blowing exercise on patients with respiratory tract diseases. So it could help patients in relive the breathing problems and patients can be given quality care.

The aim of the present study to assess the effectiveness of balloon therapy on respiratory status among the patients with lower respiratory tract diseases in selected hospitals Jalandhar, Punjab.

II. OBJECTIVES

1. To assess the pre-interventional respiratory status among the patients with lower respiratory tract diseases in experimental and control group.
2. To implement the balloon therapy among the patients with lower respiratory tract diseases in experimental group
3. To assess the post-interventional respiratory status among the patients with lower respiratory tract diseases in experimental and control group.
4. To compare the pre-interventional and post-interventional respiratory status of patients with lower respiratory tract diseases in experimental and control group.
5. To find out the association of respiratory status of the patients with lower respiratory tract diseases with their selected socio demographic variables.

III. METHODOLOGY

3.1 Research Approach:

A Quantitative research approach was used in this present study by keeping in view the nature of problem and was used assess the effectiveness of balloon therapy on respiratory status among the patients with lower respiratory tract diseases.

3.2 Research design:

In this study, the researcher used a quantitative approach and quasi experimental research design

3.3 Target Population:

The target population was all the patients with lower respiratory tract infection in selected, hospitals of Jalandhar.

3.4 Sample and Sampling Technique:

The sample consists of patient with Lower respiratory tract infection, who fulfil the inclusion criteria. Sample size was 60 (30 Experimental group and 30 Control group) was selected by non-probability purposive sampling technique.

3.5 Tool:

The tool consists of following sections:

1. Socio demographic variables include Age, Gender, Area of Residence, Education, Occupation, Family Income, Life style, Duration of Hospitalization.
2. This part involves: (1) Modified dyspnoea scale, (2) Self structured oxygen saturation scale and (3) Self structured respiratory rate scale.

(1) Modified dyspnoea scale was scored 0 for no symptoms, 1 for light breathlessness/ Mild, 2 for moderate, 3 for Severe and 4 for Most severe. (2) Self structured level of oxygen saturation scale was scored 0 for normal oxygen saturation, 1 for mildly impaired, 2 for moderately impaired and 3 for severely impaired. (3) Self

structured respiratory rate scale was scored 0 for normal breathing, 1 for mild difficulty, 2 for moderate difficulty, and 3 for severe difficulty.

3.6 Data collection process:

To conduct research study formal Administrative approval obtained from Medical superintendent of CIVIL hospital and ESI hospital of Jalandhar. After accepting the permission the following

Steps were taken up:

Step 1: Researchers introduced themselves and explain the purpose of the research study to the subjects.

Step 2: After getting written consent from the samples who met inclusion criteria. The samples were assigned 30 for experimental group and 30 for control group. Then Balloon therapy was given to the experimental group twice a day for three consecutive days. On third day again Post-test was taken from both experimental and control group. The same procedure was followed for all samples until the sample size reached 60.

Step 3: Analysis of collected data.

IV. RESULTS:

Description of Socio-demographic characteristics of the Subjects: In experimental group 11(36%) patients were in age group above 60 years, 23 (76%) were males & 18 (60%) belonging to rural area. Majority 19 (63%) of the patients were illiterate, 14(46%) were employed, 21(70%) family income up to 5000, Majority 14(46%) were non-smoker/Non-alcoholic. 11 (36%) patient hospitalized for 2-3 days.

In control group 14(46%) patients were in age group above 60 years, 23(76%) were males & 19(63%) belonging to rural area. Majority 19 (63%) of the patients were illiterate, 11(36%) were employed, 18(60%) family income up to 5000, Majority 13(43%) were non-smoker/Non-alcoholic. 11 (36%) patient hospitalized for less than 2 days and 2-3 days. (Table 1.1)

Table 1.1 Frequency and percentage distribution of socio demographic variables of patients with lower respiratory tract diseases**N=60**

Socio demographic variable	Experimental group (30)		Control group(30)	
	(f)	(%)	(f)	(%)
1. Age (in years)				
a) 31-40	03	10.00	04	13.33
b) 41-50	07	23.33	04	13.33
c) 51-60	09	30.00	08	26.67
d) Above 60	11	36.67	14	46.67
2. Gender				
a) Male	23	76.67	23	76.67
b) Female	07	23.33	07	23.33
3. Area of Residence				
a) Rural Area	18	60.00	19	63.33
b) Urban area	12	40.00	11	36.67
4. Education				
a) Illiterate	19	63.33	19	63.33
b) Up-to senior-secondary	11	36.67	11	36.67
c) Graduate and above	00	00.00	00	00.00
5. Occupation				
a) Unemployed	07	23.33	10	33.33
b) Employed	14	46.67	11	36.67
c) House wife	07	23.33	07	23.33
d) Retired	02	06.67	02	06.67
6. Family Income (Monthly) in Rupees				
a) Up-to 5000	21	70.00	18	60.00
b) 5001 to 10,000	07	23.33	10	33.33
c) 10,001 to 20,000	02	06.67	02	06.67
d) Above 20000	00	00.00	00	00.00
7. Life style				
a) Smoker/Non Alcoholic	08	26.67	09	30.00
b) Non-Smoker/Alcoholic	02	06.66	02	06.67
c) Smoker/Alcoholic	06	20.00	06	20.00
d) Non-Smoker/Non-Alcoholic	14	46.67	13	43.33
8. Duration of Hospitalization				
a) Less than 2 days	07	23.33	11	36.67
b) 2-3 days	11	36.67	11	36.67
c) 4-5 days	06	20.00	05	16.66
d) 6 days & Above	06	20.00	03	10.00

Objective: 1. To assess the pre-interventional respiratory status among the patients with lower respiratory tract diseases in experimental and control group.

Table 2.1 Frequency and percentage distribution of pre-interventional Level of dyspnea among patients in experimental and control group.

N=60

Level of Dyspnea	Experimental group		Control group	
	(f)	(%)	(f)	(%)
No symptoms	00	00.00	00	00.00
Mild	07	23.33	08	26.67
Moderate	22	73.34	17	56.67
Severe	01	03.33	04	13.33
Most severe	00	00.00	01	03.33

Maximum score- 4 Minimum score -0

Table 2.1 shows that the pre-interventional level of dyspnea among the patients that 23.33% (07) of the patients had mild level of dyspnea, 73.34% (22) had moderate level of dyspnea, 03.33% (01) had severe level of dyspnea and 00% patient had most severe level of dyspnea in experimental group. On other hand 26.67% (8) had mild level of dyspnea, 56.67% (17) had moderate level of dyspnea, 13.33% (04) had severe level of dyspnea and 3.33% (01) had most severe level of dyspnea in control group. None of the patients had normal level of dyspnea in both experimental and control group.

Table 2.2 Frequency and percentage distribution of pre-interventional Level of Oxygen saturation among the patients in experimental and control group.

N=60

Level of Oxygen saturation	Experimental group		Control group	
	(f)	(%)	(f)	(%)
Normal Oxygen saturation	00	00.00	02	06.67
Mildly Impaired	16	53.33	10	33.33
Moderately Impaired	12	40.00	16	53.33
Severely Impaired	02	06.67	02	06.67

Study range of oxygen saturation

Maximum- 98 % Minimum- 83 %

Table 2.2 shows the frequency and percentage distribution of pre-interventional level of oxygen saturation among the patients that none of the patient had normal oxygen saturation, 53.33 % (16) had mildly impaired oxygen saturation, 40% (12) had moderately impaired oxygen saturation, 06.67% (02) had severely impaired oxygen saturation in experimental group whereas 06.67% (02) had normal oxygen saturation, 33.33% (10) had mildly impaired oxygen saturation, 53.33% (16) moderately impaired oxygen saturation, 06.67% (2) had severely impaired oxygen saturation in control group.

Table 2.3 Frequency and percentage distribution of pre-interventional Respiratory rate among patients in experimental and control group

N=60

Respiratory rate	Experimental group		Control group	
	(f)	(%)	(f)	(%)
Normal Breathing	00	00.00	00	00.00
Mild Difficulty	11	36.67	08	26.67
Moderate Difficulty	17	56.67	21	70.00
Severe Difficulty	02	06.66	01	03.03

Maximum – 31

Minimum –18

Table 2.3 shows that the pre-interventional respiratory rate among the patients in experimental group that no one had normal breathing, 36.67% (11) had mild difficulty in breathing, 56.67% (17) had moderate difficulty in breathing, 06.66% (02) had severe difficulty in breathing in experimental group whereas no one had normal breathing, 26.67% (08) had mild difficulty in breathing, 70% (21) had moderate difficulty in breathing, 03.3% (01) had severe difficulty breathing in control group.

Objective 3: To assess the post-interventional respiratory status among the patients with lower respiratory tract diseases in experimental and control group.

Table: 3.1 Frequency and percentage distribution of post-interventional Level of Dyspnea among patients in Experimental and Control group.

N=60

Level of Dyspnea	Experimental group		Control group	
	(f)	(%)	(f)	(%)
No symptoms	05	16.67	00	00.00
Mild	18	60.00	13	43.34
Moderate	07	23.33	12	40.00
Severe	00	00.00	04	13.33
Most severe	00	00.00	01	03.33

Maximum score-0

Minimum score-4

Table 3.1 shows that the frequency and percentage distribution of post- interventional level of dyspnea among the patients were 16.67% (05) had no symptoms, 60% (18) had mild, 23.33% (07) had moderate, 00% none of the patient had severe and most severe level of dyspnea in experimental group whereas 00% had no symptoms of dyspnea, 43.34% (13) had mild, 40.00%(12) had moderate level,13.33% (04) had severe, 03.33% (01) had most severe level of dyspnea in control group.

Table 3.2 Frequency and percentage distribution of pre-interventional Level of Oxygen saturation among the patients in experimental and control group.

N=60

Level of Oxygen saturation	Experimental group		Control group	
	(f)	(%)	(f)	(%)
Normal Oxygen saturation	10	33.33	02	06.67
Mildly Impaired	15	50.00	14	46.67
Moderately Impaired	05	16.66	12	40.00
Severely Impaired	00	00.00	02	06.67

Study range of oxygen saturation

Maximum- 98 %

Minimum- 83 %

Table 3.2 shows that the frequency and percentage distribution of post-interventional level of oxygen saturation among the patients 33.33% (10) had normal Oxygen saturation, 50.33% (15) had mildly impaired Oxygen saturation, 16.66% (05) had moderately impaired Oxygen saturation, none of the patient had severely impaired Oxygen saturation in experimental group whereas 06.67% (02) had normal Oxygen saturation, 46.67% (14) had mildly impaired Oxygen saturation, 40.00% (12) moderately impaired Oxygen saturation, 06.67% (02) had severely impaired Oxygen saturation in control group.

Table 3.3 Frequency and percentage distribution of pre-interventional Respiratory rate among patients in experimental and control group

N=60

Respiratory rate	Experimental group		Control group	
	(f)	(%)	(f)	(%)
Normal Breathing	02	06.67	00	00.00
Mild Difficulty	23	76.67	11	36.67
Moderate Difficulty	05	16.66	18	60.00
Severe Difficulty	00	00.00	01	03.03

Maximum – 31 Minimum –18

Table 3.3 shows that the frequency and percentage distribution of post-interventional respiratory rate among patients in experimental group were 06.67% (02) had normal breathing, 76.67% (23) had mild difficulty in breathing, 16.66% (05) had moderate difficulty in breathing and none of the patient had severe difficulty in breathing whereas in control group none of the patient had normal breathing, 36.67% (11) had mild difficulty in breathing, 60.00% (18) moderate difficulty in breathing, 03.03% (01) had severe difficulty in breathing.

Objective 4- To compare the pre-interventional and post-interventional respiratory status of patients with lower respiratory tract diseases in experimental and control group.

Table 4.1 Comparison of Pre interventional and post interventional level of dyspnea among the patients in experimental group

Level of Dyspnea	No symptoms	Mild	Moderate	Severe	Most severe	X ² value
Pre- interventional	00	07	22	01	00	18.598***
Post- interventional	05	18	07	00	00	

Maximum score-4

* = Significant at p< 0.001

Minimum score-0

Table 4.1 shows that in experimental group the pre-interventional level of dyspnea was moderate whereas in post interventional level of dyspnea was mild. This difference in frequencies was statistically significant at p<0.001

Table 4.2 Comparison of pre-interventional and post-interventional level of dyspnea among the patients in control group

Level of Dyspnea	No symptoms	Mild	Moderate	Severe	Most severe	X ² value
Pre- interventional	00	08	17	04	01	2.0525NS
Post- interventional	00	13	12	04	01	

Minimum score-0

Maximum score-4

NS =Non Significant

Table 4.2 shows in control group the pre-interventional (observation 1) level of dyspnea was moderate whereas in post interventional (observation 2) level of dyspnea was mild. This difference in frequencies was statistically non significant at p<0.05.

Table 4.3 Comparison of pre-interventional and post interventional level of oxygen saturation among the patients in experimental and control group

N=60

Oxygen saturation	Experimental group			Control group			df	“t”
	n	Mean	SD	n	Mean	SD		
Pre -interventional	30	89.90	3.39	30	90.30	3.91	58	0.43 ^{NS}
Post -interventional	30	95.80	2.97	30	90.60	3.82	58	5.85***
	df= 29 t=7.11***			df= 29 t=0.3 ^{NS}				

Study range of oxygen saturation

NS=Non significant

Maximum- 99

***= Significant at p<0.001

Minimum- 81

Table 4.3 shows the difference in means of post-interventional in experimental and post interventional (observation 2) control group was statistically significant at $p < 0.001$ level.

Table 4.4 Pre-interventional and post-interventional respiratory rate among the patients in experimental and control group

Respiratory rate	Experimental group			Control group			df	“t”
	n	Mean	SD	n	Mean	SD		
Pre -interventional	30	24.60	2.6	30	25.40	2.92	58	1.1 ^{NS}
Post -interventional	30	21.60	2.3	30	25.40	3.4	58	5.14***
df= 29 t=7.11***				df= 29 t=0.3 ^{NS}				

Study range of respiratory rate

NS=Non significant

Maximum- 31

***= Significant at $p < 0.001$

Minimum-18

Table 4.4 shows the difference in means of post-interventional in experimental and post interventional (observation 2) control group was statistically significant at $p < 0.001$ level.

Objective 5- To find out the association of respiratory status of the patients with lower respiratory tract diseases with their selected socio demographic variables.

In experimental and control group various socio demographic variables i.e. age, gender, area of residence, education, occupation, family income, life style and duration of hospitalization has no effect on level of Dysnea, level of oxygen saturation and respiratory among the patients with lower respiratory tract diseases

V. CONCLUSION:

Most of the patients belong to above 60 years of age both in experimental group and control group. In both experimental and control group majority of gender were male belongs to rural area were illiterate and most of them were employed and their family income per month (in rupees) was up to Rs 5000 and most of them were non-smoker/non-alcoholic. Regarding duration of hospitalization 2-3 days were in both experimental group and control group.

Hence it can be said that of balloon therapy was effective in improving the dyspnea, Oxygen saturation and respiratory rate among the patients with lower respiratory tract diseases in experimental group as compared to control group. These findings are supportive by a study conducted by Lai Dee, on significance of regular blowing up ordinary rubber balloons. The study reported a significant reduction in breathlessness after regular balloon inflation in experimental group as compared to control group.¹⁸

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